

**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

Electrification and the Grid of the Future

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Docket No. AD21-12-000

**Statement of Pedro Pizarro  
President and CEO, Edison International  
April 29, 2021 Technical Conference**

Good afternoon, I am Pedro Pizarro, President and CEO at Edison International. I am also Vice Chairman of the Edison Electric Institute (“EEI”) and serve as the co-chair of EEI’s CEO Task Force on Electric Transportation. I am appearing today on behalf of EEI.

EEI is the association that represents all U.S. investor-owned electric companies. Our members provide electricity for about 220 million Americans and operate in all 50 states and the District of Columbia. As a whole, the electric power industry supports more than 7 million jobs in communities across the United States. EEI’s members are committed to getting the electricity we provide as clean as we can, as fast as we can, while providing affordable and reliable electricity to customers now and in the future.

I would like to thank the Federal Energy Regulatory Commission (“Commission”) for convening this technical conference to discuss how the electric power industry is preparing for electrification to deliver clean energy across the U.S. economy. Edison International, EEI, and its members are at the forefront of this effort and appreciate the opportunity to participate today.

1. Electric Transportation is Critical to Decarbonizing the Economy

Today, nearly 40 percent of the nation's electricity comes from carbon-free sources, and carbon emissions from the U.S. power sector are at their lowest level in more than 40 years—and continue to fall. As the use of carbon-free resources for electric generation continues to

increase, electrification of all sectors will play a critical role in decarbonizing the economy. The electric power sector will enable affordable decarbonization across the economy especially through significant electrification of transportation.

The transportation sector has been the largest emitting sector of the U.S. economy since 2016. Even with the pandemic reducing travel in the U.S., carbon emissions from the transportation sector are 12 percent higher than electric power sector emissions as of the end of 2020.<sup>1</sup> Whereas the electric power sector has a diverse mix of energy resources for electric generation, more than 90 percent of transportation energy in the U.S. comes from petroleum. Thus, while electrification will be needed in various aspects of the economy including water and space heating for buildings, industrial processes, and agriculture among others, transportation represents the largest carbon emitting sector of the economy, and the largest opportunity for electrification growth. I will focus my remarks today on our industry's efforts around electric transportation.

## 2. The electric grid can accommodate electrification

The electric grid is undergoing a transformation. The electric power industry contributes \$880 billion annually to U.S. gross domestic product, about 5 percent of the nation's total. Each year, our industry invests more than \$110 billion in generation, transmission, and distribution to make the electric grid stronger, smarter, cleaner, more dynamic, and more secure. These investments enable us to integrate more clean energy and new technologies into our electric systems, including electric vehicles ("EVs"), to benefit customers.

Many transportation modes, including individually-owned passenger EVs, have the potential to be flexible load, if properly enabled and managed. Adding electricity usage from

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<sup>1</sup> EIA, Monthly Energy Review, March 2021

transportation to the electric grid in a way that minimizes additional cost can increase the utilization of the whole system – which benefits all customers. Consequently, electrifying transportation represents a significant opportunity to put downward pressure on electric rates for existing electric customers. Given the need for charging and other infrastructure to serve light-, medium-, and heavy-duty vehicles, electric companies can help advance transportation electrification through investments across the utility value chain, from distribution to transmission. However, we must make the needed investments in transmission expansion today if projects are to be online and ready to support the levels of EV adoption needed to decarbonize. With the right policies, increased electrification can improve the overall efficiency of the electric grid.

Though EVs make up less than one percent of vehicles on the road today, we are confident that the electric grid will be able to handle the increased load in the near-term. With a combination of managed charging strategies and targeted infrastructure upgrades in high usage corridors and locations, the electric grid can meet the additional EV load and proactively drive EV adoption over the next decade. However, accommodating high degrees of electrification in the long-term will require significant investment. EEI and its members are already working with our state regulators to prepare for that future.

EEI and the Institute for Electricity Innovation (“IEI”) forecast that the number of EVs on the road could grow to more than 18 million by 2030, which would comprise about seven percent of all light-duty vehicles on the road.<sup>2</sup> While this represents significant growth, Princeton’s ‘Net-Zero America’ study shows that to meet a 2050 net zero emissions goal, the

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<sup>2</sup> EEI and IEI, *Electric Vehicle Sales Forecast and the Charging Infrastructure Required Through 2030*, November 2018, [https://www.edisonfoundation.net/-/media/Files/IEI/publications/IEI\\_EEI-EV-Forecast-Report\\_Nov2018.ashx](https://www.edisonfoundation.net/-/media/Files/IEI/publications/IEI_EEI-EV-Forecast-Report_Nov2018.ashx)

U.S. will require about 50 million light duty vehicles by 2030 or about 20 percent of today's light duty vehicles.<sup>3</sup> A Pacific Northwest National Lab study that looked at the bulk power system in the western U.S. found that transmission and generation resources are "likely to be sufficient" for a high EV penetration, in this case considering a scenario where EVs make up more than nine percent of light-duty vehicles on the road by 2028.<sup>4</sup> Importantly, the same study showed that if EV charging is managed, the electric grid could accommodate an EV penetration of 25 percent.

Southern California Edison has one of the highest penetrations of EVs in the country today, so we view our service area as a preview of things to come for the rest of the country. The good news is that our system is well-suited to handle EVs today. California's investor-owned electric companies evaluated the service and distribution system upgrades needed due to the addition of EV load and have determined that the number of upgrades and associated costs to date have been low.<sup>5</sup>

However, we recognize that California has some aggressive goals for electrification, including an Executive Order calling for all light-duty vehicle sales in the state to be zero-emission by 2035.<sup>6</sup> In our Pathway 2045 study, we modeled a scenario to meet the state's economy-wide carbon reduction goals, including aggressive electrification of the transportation sector that is consistent with the Governor's glidepath. From 2030 to 2045, grid investments of

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<sup>3</sup> Princeton University, *Net-Zero America – Potential Pathways, Infrastructure, and Impacts*, December 2020, [https://environmentalcentury.princeton.edu/sites/g/files/toruqf331/files/2020-12/Princeton\\_NZA\\_Interim\\_Report\\_15\\_Dec\\_2020\\_FINAL.pdf](https://environmentalcentury.princeton.edu/sites/g/files/toruqf331/files/2020-12/Princeton_NZA_Interim_Report_15_Dec_2020_FINAL.pdf)

<sup>4</sup> Pacific Northwest National Lab, *Electric Vehicles at Scale – Phase I Analysis: High EV Adoption Impacts on the Western U.S. Power Grid*, July 2020

<sup>5</sup> Joint IOU Electric Vehicle Load Research Report, 7<sup>th</sup> Report, June 2019, <https://efiling.energy.ca.gov/GetDocument.aspx?tn=228787-14&DocumentContentId=60075>

<sup>6</sup> California Executive Order N-79-20, November 2020

up to \$75 billion statewide will be required to integrate bulk renewable generation and storage and serve the load growth associated with transportation and building electrification.<sup>7</sup> While this level of investment is significant, it is important to emphasize that this is not driven only by transportation, but by the broader transition to a clean energy economy, leading to a 60% increase in load and 40% increase in peak demand. Furthermore, transportation is key to unlocking savings to customers: we found that the overall energy consumption cost for an average household decreases by one-third by 2045, driven by reduced gasoline consumption due to the transition to EVs.

### 3. Electric companies are supporting customers to accelerate electric transportation

EEl's member companies are proactively implementing customer programs to help customers overcome barriers to adoption, while also generating important data and experience that will inform how electric companies plan, assist their customers, and manage charging. Across the U.S. these regulator-approved programs represent nearly \$3 billion in customer programs and projects to deploy charging infrastructure and to accelerate electric transportation.<sup>8</sup>

Increased collaboration with customers is also necessary to effectively integrate EVs. EV charging occurs at a wide range of power levels, from a kilowatt at standard 120-volt outlets, up to potentially one megawatt or more for heavy-duty trucks. Electric companies are leveraging our existing planning capabilities to cost-effectively and reliably integrate the resulting changes to electricity demand, but we also need new customer collaborations to ensure we have visibility into customer needs. This need is particularly acute for fleet customers, who have higher power

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<sup>7</sup> Southern California Edison, Pathway 2045, November 2019

<sup>8</sup> EEl, Electric Transportation Biannual State Regulatory Update, February 2021, [https://www.eei.org/issuesandpolicy/electrictransportation/Documents/FINAL\\_ET%20Biannual%20State%20Regulatory%20Update\\_February2021.pdf](https://www.eei.org/issuesandpolicy/electrictransportation/Documents/FINAL_ET%20Biannual%20State%20Regulatory%20Update_February2021.pdf)

needs than passenger EVs. Providing electric service to fleet depots where many EV trucks are charging, for example, could require significant distribution or sub-transmission upgrades to bring adequate power to that facility. The EEI electric transportation task force is working closely with commercial fleet customers to encourage them to work with their electric companies early in their planning so we can accommodate their load needs, while also understanding their reliability and resilience needs. We are also working with our state regulators to plan for broader electric upgrades that may be needed to support EV charging.

a. Deploying charging infrastructure

The lack of charging infrastructure is a primary barrier to widespread EV adoption. EEI's members support the deployment of charging infrastructure in a variety of locations and for all types of customers. Some electric companies own and operate charging stations, which is particularly beneficial to consumers who prefer not to procure and maintain charging infrastructure and seek a turnkey solution. Some of our members install the "make ready" infrastructure that connects to the charging equipment, leaving it to the consumer to own and maintain the charging station. Other members offer rebate programs to offset the costs to install charging infrastructure. Regardless of the approach, each of these solutions is critical to building charging infrastructure that helps to spur the EV market and benefit communities. This is particularly true in regions where private investment in EV charging stations historically has been difficult.

It is important that all communities have access to the benefits of EVs, and our members are investing in underserved communities, in electrifying car-sharing and public transportation systems that serve those who do not own vehicles, in electrifying commercial vehicles such as delivery trucks that operate within neighborhoods, and in ensuring that Americans can charge

their vehicles coast-to-coast in urban, suburban, and rural communities. Each community may have a different model that works best to ensure that all customers have access to the benefits of electric vehicles. Providing flexibility will ensure that more communities can participate in charging programs, leading to more EV charging stations across the country. Ensuring that EVs are a viable and attractive option for individuals in all communities is necessary to limit global warming to 1.5 degrees Celsius from pre-industrial levels, as the IPCC recommends.

Electric companies are supporting charging infrastructure for a broad set of applications so that as many customers as possible can benefit directly from using EVs. Increasing transportation electrification has significant societal benefits, including improved local air quality, particularly in communities disproportionately burdened by truck and bus pollution. Electric companies are well matched to the scale and speed of investment needed, with a track record of making investments in the public interest and maintaining a reliable system. For these reasons, it is appropriate for electric companies to make investments on behalf of our customers that will provide benefits for them.

For example, Southern California Edison alone has been approved for more than \$850 million in customer programs that support EV charging infrastructure, with a significant focus on infrastructure in disadvantaged communities. Forty percent of our Charge Ready Transport program, which is helping to deploy charging infrastructure for medium- and heavy-duty EVs, is dedicated to installations in disadvantaged communities, and 50 percent of the EV charging installations within our Charge Ready 2 program, which is deploying charging infrastructure for passenger EVs at multi-unit dwellings, workplaces, and public locations, will be installed in disadvantaged communities.<sup>9</sup>

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<sup>9</sup> Southern California Edison, Charge Ready programs, <https://www.sce.com/business/electric-cars/Charge-Ready>

## b. Managed charging

As EV penetration increases in the years ahead, it will be important to implement managed charging to minimize costs to the electric grid. Managed charging refers to any strategy that provides a signal to influence how drivers charge their EVs, including time-varying rates, demand response programs, and other types of “smart charging” plans that control when and how an EV draws power. While there is not a single strategy that works for all use cases, now is the time to test different price signals and participation models to see what works so that electric companies and others can implement effective solutions to manage charging to benefit customers as EV adoption increases.

Electric companies need flexibility to test and implement a wide range of strategies. For example, while time-varying rates are an important component of managed charging, they may not be sufficient alone. More proactive strategies may be needed to avoid demand spikes if many EVs start charging at the beginning of a time-of-use off-peak period. Likewise, different use cases may have different needs. Long-duration charging, such as while an EV is parked overnight, provides significant charging flexibility. Short-duration, high-power charging – such as at a public DC fast charging station – may not provide much flexibility and may require other solutions. Furthermore, multiple communications pathways exist to send price signals to EV drivers, charging station networks, and commercial customers.

Whatever the use case and technology solution, a few principles are important from our perspective. First, any managed charging solution should not disrupt customers’ transportation needs and should be as easy to use and seamless as possible. Second, as the operators of the electric grid, it is important for electric companies to have appropriate visibility and control over managed charging solutions to ensure they are benefitting individual customers and the system



as a whole. Third, EVs have the potential to provide many of the attributes of other distributed energy resources (“DER”s), such as local backup power and power to the electric grid. Further technical development is needed to lay the foundation for successful managed charging strategies.

In Southern California Edison’s case, we have developed EV-specific TOU rates that provide a phase-in of demand charges over time. This allows commercial customers time to adapt their operations to reflect electric rates, while providing price signals to use electricity in a cost-efficient way. In addition to charging infrastructure deployment, SCE’s Charge Ready programs test different demand response programs to see how customers respond.

In conclusion, electrification of transportation has multiple benefits, including reduced emissions, better air quality and reduced fuel costs for customers. As electric companies add more clean energy resources to the electric grid, we are eager to leverage our progress to benefit other sectors of the economy through electrification. The electric system is ready to handle electrification today and if we continue to partner with our regulators and other stakeholders, we will be able to accommodate load growth from electric vehicles as we make significant investments to ensure a safe, reliable, and increasingly clean electric grid. Electric transportation will play a key role going forward by adding flexible load that can be used to help manage the grid. Electric companies today are supporting electric transportation by helping to deploy charging infrastructure, while laying the groundwork for managed charging solutions that will ensure EVs are integrated into the electric grid in a manner that benefits all customers.